

WHAT IS CLAIMED IS:

1           1.       A method for enabling access to data, comprising:  
2           receiving a call from a client to invoke a remote interface method;  
3           accessing, with a remote interface implementation, parameters from the received call in  
4           response to the invocation of the remote interface method;  
5           generating a stored procedure call with the accessed parameters as input parameters of  
6           the stored procedure;  
7           transferring the stored procedure call to a stored procedure named by the call to  
8           execute;  
9           receiving output from the stored procedure;  
10          inserting the received output from the stored procedure into a data object; and  
11          returning the data object to the client.

1           2.       The method of claim 1, wherein the stored procedure executes in a database  
2           server and generates the output, wherein the output is capable of comprising output that is a  
3           member of the set of output comprising one or more result sets of data from the database table  
4           and one or more output parameters resulting from stored procedure operations performed on  
5           data in the database table.

1           3.       The method of claim 1, further comprising processing, with the remote interface  
2           implementation, an input mapping to determine the parameters in the client call to use as input  
3           parameters to the stored procedure call.

1           4.       The method of claim 1, further comprising:  
2           receiving the stored procedure output after the stored procedure program completes  
3           execution.

1           5.     The method of claim 1, further comprising processing an output mapping  
2     indicating how the stored procedure output is mapped to the data object.

1           6.     The method of claim 5, wherein the output is capable of including result sets  
2     and parameters, wherein the output mapping indicates an order in which the received result sets  
3     and parameters are added to the data object

1           7.     The method of claim 1, further comprising:  
2             generating metadata describing the stored procedure output included in the data object;  
3     and  
4             adding the metadata to the data object.

1           8.     The method of claim 7, further comprising:  
2             processing, with the client, the metadata in the received data object to determine how  
3     to access the stored procedure output from the data object.

1           9.     The method of claim 7, wherein the data object is comprised of multiple  
2     elements, wherein the stored procedure output includes rows of data from at least one result  
3     set, wherein inserting the stored procedure output into the data object further comprises  
4     inserting data from each column in each row in each result set to one element in the data object,  
5     and wherein the metadata defines structure and types of data in each element.

1           10.    The method of claim 7, wherein the data object is comprised of multiple  
2     elements, and wherein the stored procedure output is capable of including multiple output  
3     parameters, wherein inserting the stored procedure output into the data object further  
4     comprises inserting each output parameter into one element in the data object, and wherein the  
5     metadata provides information on structure and type of the data in each element.

1           11.     The method of claim 1, wherein the client only receives one data object with  
2 stored procedure output in response to the call.

1           12.     The method of claim 1, wherein the remote interface implementation is  
2 implemented as a Enterprise JavaBean and wherein the data object comprises a Java  
3 serializable object.

1           13.     A method for making stored procedure programs available to application  
2 programs, comprising:  
3           determining one stored procedure program generating output needed by one  
4 application program;  
5           generating a remote interface implementation to respond to a remote interface method  
6 capable of receiving a call from the application program including data and invoking a stored  
7 procedure in a database server with the data from the application program used as input; and  
8           generating an output mapping for the remote interface implementation to use to  
9 determine how to insert the stored procedure output into a data object that may be used by the  
10 application program.

1           14.     The method of claim 13, wherein the generated remote interface implementation  
2 inserts metadata into the data object providing information on the stored procedure output  
3 inserted into the data object.

1           15.     A system for enabling access to data, comprising:  
2           means for receiving a call from a client to invoke a remote interface method;  
3           means for accessing, with a remote interface implementation, parameters from the  
4 received call in response to the invocation of the remote interface method;

1 means for generating a stored procedure call with the accessed parameters as input  
2 parameters of the stored procedure;  
3 means for transferring the stored procedure call to a stored procedure named by the  
4 call to execute;  
5 means for receiving output from the stored procedure;  
6 means for inserting the received output from the stored procedure into a data object;  
7 and  
8 means for returning the data object to the client.

1 16. The system of claim 15, wherein the stored procedure executes in a database  
2 server and generates the output, wherein the output is capable of comprising output that is a  
3 member of the set of output comprising one or more result sets of data from the database table  
4 and one or more output parameters resulting from stored procedure operations performed on  
5 data in the database table.

1 17. The system of claim 15, further comprising means for processing, with the  
2 remote interface implementation, an input mapping to determine the parameters in the client call  
3 to use as input parameters to the stored procedure call.

1 18. The system of claim 15, further comprising:  
2 means for receiving the stored procedure output after the stored procedure program  
3 completes execution.

1 19. The system of claim 15, further comprising means for processing an output  
2 mapping indicating how the stored procedure output is mapped to the data object.

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1           20.     The system of claim 19, wherein the output is capable of including result sets  
2     and parameters, wherein the output mapping indicates an order in which the received result sets  
3     and parameters are added to the data object

1           21.     The system of claim 15, further comprising:  
2             means for generating metadata describing the stored procedure output included in the  
3     data object; and  
4             means for adding the metadata to the data object.

1           22.     The system of claim 21, further comprising:  
2             means for processing, with the client, the metadata in the received data object to  
3     determine how to access the stored procedure output from the data object.

1           23.     The system of claim 21, wherein the data object is comprised of multiple  
2     elements, wherein the stored procedure output includes rows of data from at least one result  
3     set, wherein the means for inserting the stored procedure output into the data object further  
4     inserts data from each column in each row in each result set to one element in the data object,  
5     and wherein the metadata defines structure and types of data in each element.

1           24.     The system of claim 21, wherein the data object is comprised of multiple  
2     elements, and wherein the stored procedure output is capable of including multiple output  
3     parameters, wherein the means for inserting the stored procedure output into the data object  
4     further inserts each output parameter into one element in the data object, and wherein the  
5     metadata provides information on structure and type of the data in each element.

1           25.     The system of claim 15, wherein the client only receives one data object with  
2     stored procedure output in response to the call.

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1           26.    The system of claim 15, wherein the remote interface implementation is  
2 implemented as a Enterprise JavaBean and wherein the data object comprises a Java  
3 serializable object.

1           27.    A system for making stored procedure programs available to application  
2 programs, comprising:  
3           means for determining one stored procedure program generating output needed by one  
4 application program;  
5           means for generating a remote interface implementation to respond to a remote  
6 interface method capable of receiving a call from the application program including data and  
7 invoking a stored procedure in a database server with the data from the application program  
8 used as input; and  
9           means for generating an output mapping for the remote interface implementation to use  
10 to determine how to insert the stored procedure output into a data object that may be used by  
11 the application program.

1           28.    The system of claim 27, wherein the generated remote interface implementation  
2 inserts metadata into the data object providing information on the stored procedure output  
3 inserted into the data object.

1           29.    An article of manufacture for enabling access to data by:  
2 receiving a call from a client to invoke a remote interface method;  
3 accessing, with a remote interface implementation, parameters from the received call in  
4 response to the invocation of the remote interface method;  
5 generating a stored procedure call with the accessed parameters as input parameters of  
6 the stored procedure;

1           transferring the stored procedure call to a stored procedure named by the call to  
2   execute;  
3           receiving output from the stored procedure;  
4           inserting the received output from the stored procedure into a data object; and  
5           returning the data object to the client.

1           30.    The article of manufacture of claim 29, wherein the stored procedure executes  
2   in a database server and generates the output, wherein the output is capable of comprising  
3   output that is a member of the set of output comprising one or more result sets of data from the  
4   database table and one or more output parameters resulting from stored procedure operations  
5   performed on data in the database table.

1           31.    The article of manufacture of claim 29, further comprising processing, with the  
2   remote interface implementation, an input mapping to determine the parameters in the client call  
3   to use as input parameters to the stored procedure call.

1           32.    The article of manufacture of claim 29, further comprising:  
2           receiving the stored procedure output after the stored procedure program completes  
3   execution.

1           33.    The article of manufacture of claim 29, further comprising processing an output  
2   mapping indicating how the stored procedure output is mapped to the data object.

1           34.    The article of manufacture of claim 33, wherein the output is capable of  
2   including result sets and parameters, wherein the output mapping indicates an order in which the  
3   received result sets and parameters are added to the data object

1           35.     The article of manufacture of claim 29, further comprising:  
2           generating metadata describing the stored procedure output included in the data object;  
3     and  
4           adding the metadata to the data object.

1           36.     The article of manufacture of claim 35, further comprising:  
2           processing, with the client, the metadata in the received data object to determine how  
3     to access the stored procedure output from the data object.

1           37.     The article of manufacture of claim 35, wherein the data object is comprised of  
2     multiple elements, wherein the stored procedure output includes rows of data from at least one  
3     result set, wherein inserting the stored procedure output into the data object further comprises  
4     inserting data from each column in each row in each result set to one element in the data object,  
5     and wherein the metadata defines structure and types of data in each element.

1           38.     The article of manufacture of claim 35, wherein the data object is comprised of  
2     multiple elements, and wherein the stored procedure output is capable of including multiple  
3     output parameters, wherein inserting the stored procedure output into the data object further  
4     comprises inserting each output parameter into one element in the data object, and wherein the  
5     metadata provides information on structure and type of the data in each element.

1           39.     The article of manufacture of claim 29, wherein the client only receives one data  
2     object with stored procedure output in response to the call.

1           40.     The article of manufacture of claim 29, wherein the remote interface  
2     implementation is implemented as a Enterprise JavaBean and wherein the data object  
3     comprises a Java serializable object.



1           41.    An article of manufacture for making stored procedure programs available to  
2 application programs by:  
3           determining one stored procedure program generating output needed by one  
4 application program;  
5           generating a remote interface implementation to respond to a remote interface method  
6 capable of receiving a call from the application program including data and invoking a stored  
7 procedure in a database server with the data from the application program used as input; and  
8           generating an output mapping for the remote interface implementation to use to  
9 determine how to insert the stored procedure output into a data object that may be used by the  
10 application program.

1           42.    The article of manufacture of claim 41, wherein the generated remote interface  
2 implementation inserts metadata into the data object providing information on the stored  
3 procedure output inserted into the data object.